

## Terms/Terminology Integration

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### Remedial Investigation/Feasibility Study integration

WAC 173-204-560(4)(f)(iii)

(iii) A phased approach for evaluation of alternatives may be required for certain sites, including an initial screening of alternatives to reduce the number of potential remedies for the final detailed evaluation. The final evaluation of cleanup action alternatives that pass the initial screening shall consider the following factors:

- (A) Overall protection of human health and the environment, time required to attain the cleanup standard(s), and onsite and off-site environmental impacts and risks to human health resulting from implementing the cleanup alternatives;
- (B) Permanence, the degree to which the alternative permanently reduces the toxicity, mobility or volume of contaminants, including the adequacy of the alternative in destroying the contaminants, the reduction or elimination of contaminants releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated. (Per MTCA Language)
- (C) Attainment of the cleanup standard(s) and compliance with applicable federal, state, and local laws;
- (D) Short-term effectiveness, including protection of human health and the environment during construction and implementation of the alternative; and
- (E) Long-term effectiveness, including degree of certainty that the alternative will be successful, long-term reliability, magnitude of residual, biological and human health risk, and effectiveness of controls for ongoing discharges and/or controls required to manage treatment residues or remaining wastes cleanup and/or disposal site risks;
  - (g) Ability to be implemented. The ability to be implemented including the potential for landowner cooperation, consideration of technical feasibility, availability of needed off-site facilities, services and materials, administrative and regulatory requirements, scheduling, monitoring requirements, access for construction, operations and monitoring, and integration with existing facility operations and other current or potential cleanup actions;
  - (h) Cost, including consideration of present and future direct and indirect capital, operation, and maintenance costs and other foreseeable costs;
  - (i) The degree to which community concerns are addressed;
  - (j) The degree to which recycling, reuse, and waste minimization are employed; and
  - (k) Environmental impact. Sufficient information shall be provided to fulfill the requirements of chapter 43.21C RCW, the State Environmental Policy Act. Discussions of significant short-term and long-term environmental impacts, significant irrevocable commitments of natural resources, significant alternatives including mitigation measures, and significant environmental impacts which cannot be mitigated shall be included.

**Comment [j1]:** In considering permanence and overall protection of human and environmental health we must also consider the temporary and permanent effects of the remediation alternatives. The environment is resilient to environmental effects of contaminants and other disturbances – it can recover given time and what needs to be implemented (at least in my mind) is an initial step of remediation so the environment can restore itself for rapidly and efficiently – removal of wetlands to accommodate removal of sediment contaminants may be more damaging than the sediment bound contaminants. Permanent solution should include remediation objects to restorable conditions and then monitoring the effectiveness of the restoration occurring over various time periods (initial response of environment, annual, decadal). These may be included in the approach but the fact that early response actions (removal of source, ‘hot spot’ removal of contaminants, enhancement of natural recovery rates, can all be considered a part of the remediation action. Demonstration that the environment is on a recovery path at the acceptable rate can then limit ongoing liability of RP.

**Comment [PA2]:** Added per MTCA

**Comment [j3]:** Outline designators are off

**Comment [j4]:** Agreements between RP and resource agencies or regulators should be supportable by all of the above and should be communicated that way to the public or community members with concerns.

## **MTCA/SMS terms integration**

### **New definition:**

Bioassay: An assessment of conditions and/or factors potentially affecting organisms or assemblages of organisms (communities) using measurable attributes associated with those organisms. This includes but is not limited to laboratory tests and field evaluations of living plants, animals, and other organisms. Also included are evaluations of indigenous field organisms for long-term effects, assessments of biological effects resulting from bioaccumulation and biomagnification, and/or extrapolated values or methods for simulating effects from prolonged exposure periods.

### **Current definition:**

"Bioassay" means a test procedure that measures the response of living plants, animals, or tissues to a sediment sample.

### **New definition:**

Biological Toxicity Test: A test procedure that measures the toxicological response of living plants, animals, other organisms, tissues or subsystems exposed to discrete samples potentially containing toxic compounds.

### **Current definition:**

None ---NOTE May replace "Appropriate biological tests" term.

### **New definition:**

Chronic bioassays: Biological assessments which measure the effects upon organisms or their populations conducted over prolonged exposure periods relative to the life span of the organism. Chronic effects related to sediment exposure may include mortality, reduced growth, impaired reproduction, histopathological abnormalities, benthic community impairment and other adverse effects to organisms as determined appropriate by the department.

### **Current definition:**

"Chronic" means measurements of biological effects using sediment bioassays conducted for, or simulating, prolonged exposure periods of not less than one complete life cycle, evaluations of indigenous field organisms for long term effects, assessment of biological effects resulting from bioaccumulation and biomagnification, and/or extrapolated values or methods for simulating effects from prolonged exposure periods. Chronic effects may include mortality, reduced growth, impaired

**Comment [j5]:** Measurement of field organisms responses (e.g., changes in benthic diversity, species richness, abundance, community dominance) are driven by many factors – not just chemical contaminants that have been selected as target analytes. Key to the assessments suggested here are to demonstrate that the change is in fact due to the contaminant or matrix of contaminants and not to other factors. These are complex assessments and need to be well designed to segregate the effects of various contributing factors to the changes that are observed.

**Comment [j6]:** I like the connection of biological effects with tissue values – a body burden is a sign of exposure – to become an effect it needs to alter more than the tissue concentrations. Same goes for both the modeled, extrapolated values.

**Comment [j7]:** Extrapolated values for mobile species based on assumptions of the relationship of tissue concentrations to the measured sediment levels are often overestimates because they are based on a single (sediment related) pathway compared to the multiple uptake pathways in various environmental compartments that an organism is exposed to.

**Comment [j8]:** Why is this being removed? We have a number of instances where toxicity tests have been performed using inappropriate species for the assessment end-point. E.g., using an estuarine species to estimate the effect that a contaminated sediment may have on organisms that are exposed to deep water sediment. Appropriate should take into account the ability to perform experiments with the test species, its major mode of exposure should be directly related to the question at hand (suspended detrital feeding organisms should not be expected to have as direct a relationship to sediment bound contaminants as an infaunal deposit feeding organism. NOT ALL AMPHIPODS ARE THE SAME.

reproduction, histopathological abnormalities, adverse effects to birds and mammals, or other endpoints determined appropriate by the department.

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**New definition:**

Acute bioassays: Biological assessments which measure the effects upon organisms conducted for exposure periods that are relatively short in comparison to the life span of the organism. Acute effects may include mortality, larval abnormality, or other endpoints determined appropriate by the department.

**Current definition:**

"Acute" means measurements of biological effects using surface sediment bioassays conducted for time periods that are relatively short in comparison to the life cycle of the test organism. Acute effects may include mortality, larval abnormality, or other endpoints determined appropriate by the department.

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**New definition:**

Sediment: Any particulate matter which has been deposited as particles on the bed or bottom of a body of water that exists for a minimum of six contiguous weeks on an annual basis.

**Current definition:**

None

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**New definition:**

Surface Sediment: Sediment located in the biologically active zone or exposed to the water column.

**Current definition:**

"Surface sediments" or "sediment(s)" means settled particulate matter located in the predominant biologically active aquatic zone, or exposed to the water column. Sediment(s) also includes settled particulate matter exposed by human activity (e.g., dredging) to the biologically active aquatic zone or to the water column.

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**New definition:**

Contaminated Sediment: Surface sediments designated under the procedures of WAC 173-204-310 as exceeding the applicable sediment quality standards of WAC 173-204-320 through 173-204-340.

**Comment [j9]:** Not sure how long this should be so maybe we should say exists for a period of time to become incorporated into the sediment – loosely consolidated clays may be an issue here because they may never truly become incorporated into the sediment. Six weeks of residence on the bottom may permit the sediment to become acclimatized to the bottom conditions at a site (e.g., z-layer acclimation to surface biogenic zones may take this long – does this also get incorporated into the testing scenario – acclimatizing sediment in holding tanks for 6 weeks prior to exposing organisms? Does this also get taken into account when sediments are held for 6-8 weeks in a cold room prior to testing? The organisms originally living in the sediment are no longer the same and any microbial communities in the sediment have at least slowed down in activity if not died off ???

**Current definition:**

"Contaminated sediment" means sediments designated under the procedures of WAC 173-204-310 as exceeding the applicable sediment quality standards of WAC 173-204-320 through 173-204-340.

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**New definition:**

Active Cleanup Action: Those activities requiring physical implementation whose intent is to result in meeting the cleanup standard. Actions include but are not limited to dredging and capping. Passive actions such as natural attenuation, natural recovery and other time-necessitated actions are not included.

**Current definition:**

None

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**New definition:**

Biologically Active Zone: The area within the sediment in which a majority of benthic macroinvertebrates are generally found. By default this is the uppermost 10 cm of the sediments. Information such as the vertical distribution of benthic macroinvertebrates or the depth to anoxic sediments can be gathered for each site to be investigated to attempt to delimit the biologically active zone.

**Current definition:**

None

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**The following three current SMS terms on the left in the table below are being proposed to be changed to those MTCA terms on the right for the sake of consistency and clarity.**

Current Rule term	Proposed Rule term
Sediment Cleanup Study Plan or Cleanup Study Plan	Remedial Investigation/Feasibility Study
Sediment Cleanup Study Report or Study Report	Cleanup Action Plan
Public information/education	Public Participation Plan

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**The following list contains additional harmonization terms which are being addressed within Ecology, but are currently not ready for presentation to the workgroup.**

*Sediment Cleanup Level*  
*Sediment Cleanup Standard*  
*Minimum Cleanup Level*